SUNSYS
Energy Storage Solution for microgrids
from 33 kVA to multiple MVA
For a secure and flexible network

Microgrids are groups of Distributed Energy Resources (DERS) and interconnected loads controllable as a single electrical system.

For grid-connected areas, microgrids can disconnect from the utility grid to provide microgrid functionality and back-up power. For isolated areas, microgrids can be fully autonomous, forming an AC grid from the DERS.

Off-grid microgrids
In remote areas, Socomec’s ESS is ideal for powering autonomous microgrids with distributed generation like solar PV, wind or diesel generation. The SUNSYS Microgrid Control Module coordinates the flow of power between the generators and the batteries and between the batteries and the load to ensure that efficiency and service life are maximized, while genset fuel consumption and harmful emissions are significantly reduced.

Grid-tied microgrids
In addition to the energy services provided by the energy storage system in grid-connected mode, Socomec’s ESS also enables the facility to function as an autonomous microgrid when grid power fails.

Smart buildings
Socomec’s ESS can be integrated with smart building functionality to maximize efficiency and reduce the cost of electricity. It can also ensure the back-up power in case of grid outage.

Typical architecture of a microgrid with SUNSYS PCS² IM.
The Energy Storage solution for microgrid power management

Socomec’s Energy Storage System (ESS) includes SUNSYS PCS² IM power conversion system with islanding mode & SUNSYS MCM microgrid control module. Socomec ESS is designed to excel in a variety of microgrid and smart building applications. During on-grid operation, it operates grid services such as primary reserves availability and grid stabilization. Its high levels of performance, availability and extended functionalities help to maximize ROI.

Your benefits

- Grid services
- Backup power
- Maximization of renewable energy self-consumption and production
- Optimization of diesel generators
- Demand charge management
- Hybrid system management
- Time-of-use bill management
- High quality and safety in off-grid mode

Certified Energy Storage System

- UL 1741SA
- IEEE 1547
- VDE 0126-1-1/A1
- VDE AR-N 4105
- CEI 0-21
- CEI 0-16
- G59/3

Grid codes compatibility is always upgrading, please contact us for potential upgrades.
A complete solution

**SUNSYS PCS\(^2\) IM**

**Bidirectional Power Converter**

- Maximum uptime:
  - modular and independent architecture,
  - easy, fast and safe maintenance thanks to hot-swap power modules,
  - no downtime during maintenance,
  - autonomous operation.
- Islanding capability - voltage generator:
  - no interruption from grid-forming to grid-following mode,
  - automatic balancing between production and consumption,
  - high performance.
- High efficiency at low power:
  - at lower power levels, the system switches off some modules, so the remaining modules can run at peak efficiency,
  - high quality and stability of power supply in islanding operation,
  - black-start functionality,
  - boosted overload and short-circuit capability.

**SUNSYS MCM**

**Microgrid Control Module**

It integrates a Microgrid Management System that manages the functions of a microgrid:
- controls the charge/discharge of batteries and curtails production from renewable generation when the batteries are fully charged,
- automatically disconnects from the grid when the power fails and re-powers the microgrid from batteries and renewable generation; it automatically reconnects to the grid when grid power is restored in full transparency for the customer,
- balances the load between multiple SUNSYS PCS\(^2\) IM cabinets.

The control panel with integrated webserver enables local control and monitoring, in addition to remote control and monitoring.

**Battery cabinet**

Various battery technologies and battery configurations are available to fulfill almost any customer’s requirements.
Distribution module

- Connects multiple SUNSYS PCS² IM in parallel and multiple battery racks in parallel to deliver the power and energy needed for almost any installation.
- Disconnects SUNSYS PCS² IM and the batteries so that maintenance may be performed safely.

A reliable parallel connection

The Source Measurement and Connection Module manages the connection of sources to the microgrid. Measurement is performed by DIRIS Digware in order to provide all the necessary real-time data from the variety of equipment a microgrid requires to function properly. Parallel connection of the sources is achieved after source synchronization has been managed by the Microgrid Control Module.

Multi-circuit Power Monitoring devices

DIRIS Digware system is the most effective solution for metering consumption and monitoring the quality of electrical energy. It brings a high degree of flexibility to installations and makes connection and configuration easy.
Your benefits

**Grid services**

DSO and TSO are responsible for the quality and stability of the electrical grid. Due to higher consumptions and decentralised production, constraints on this grid are increasing, thus creating a need for grid services. The rapid response times of the Socomec SUNSYS PCS² IM are ideal for delivering grid services such as voltage and frequency regulation. Socomec’s ESS can also export power to the grid when the utilities may require, earning Demand Response payments from the utility.

**Back-up power**

When the grid fails, Socomec’s ESS maintains power availability to the loads. The solution automatically disconnects from the grid and the SUNSYS PCS² IM re-powers the microgrid from batteries and renewable generation, acting as a voltage generator. Moreover the blackstart function enables to take over supply without need for oversized power due to inductive loads.

**Maximization of renewable energy self-consumption and production**

One of the service provided by Socomec’s ESS is to use the energy from the network during time of low price and to use energy from the batteries during high price periods. Therefore the system enables to reduce the energy costs and the customers’ bills.

**Demand Charge Management**

Consumption of electricity during high peak periods have several drawbacks, they are expensive and might require an invest in the infrastructures that are not designed for them. To prevent from these costs, Socomec’s ESS can reduce demand charges by discharging power stored in the batteries during peak demand intervals.

**Optimization of diesel generators**

Adding energy storage with renewable generation can be a cost-effective way to reduce the use of diesel generators in microgrids, thus diminishing CO₂ emissions, improving the diesel generators lifespan, duration, and increasing autonomy for a given fuel supply.

**Time-of-use bill management**

One of the service provided by Socomec’s ESS is to use the energy from the network during time of low price and to use energy from the batteries during high price periods. Therefore the system enables to reduce the energy costs and the customers’ bills.

**High quality and safety in off-grid mode**

Socomec’s ESS has high short-circuit capabilities that enables the same protections in off-grid mode as in an grid-tied mode. Voltage, frequency and THD delivered stay within the limits defined by EN 50160.
## Technical data

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Model</th>
<th>33TR</th>
<th>66TR</th>
<th>100TR</th>
<th>132TL</th>
<th>166TL</th>
<th>200TL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input (DC)</strong></td>
<td>Battery voltage</td>
<td>Full power from 450 to 825 VDC - 350 to 850 VDC with derating</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of independent power modules</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
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<tr>
<td>Maximum discharging current</td>
<td>80 A</td>
<td>160 A</td>
<td>240 A</td>
<td>160 A + 160 A</td>
<td>240 A + 160 A</td>
<td>240 A + 240 A</td>
<td></td>
</tr>
<tr>
<td>Maximum recharging current</td>
<td>80 A</td>
<td>160 A</td>
<td>240 A</td>
<td>160 A + 160 A</td>
<td>240 A + 160 A</td>
<td>240 A + 240 A</td>
<td></td>
</tr>
<tr>
<td><strong>Output (AC)</strong></td>
<td>Rated power</td>
<td>33 kW</td>
<td>66 kW</td>
<td>100 kW</td>
<td>132 kW</td>
<td>166 kW</td>
<td>200 kW</td>
</tr>
<tr>
<td>Rated apparent power</td>
<td>33 kVA</td>
<td>66 kVA</td>
<td>100 kVA</td>
<td>132 kVA</td>
<td>166 kVA</td>
<td>200 kVA</td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>480 Vrms 3ph</td>
<td></td>
<td></td>
<td></td>
<td>290 Vrms 3ph</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage tolerance</td>
<td>423 - 528 Vrms 3ph + N</td>
<td></td>
<td></td>
<td></td>
<td>252 - 308 Vrms 3ph</td>
<td></td>
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<tr>
<td>Rated frequency</td>
<td>60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Frequency range</td>
<td>59.3 - 60.5 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current</td>
<td>48 Arms</td>
<td>96 Arms</td>
<td>144 Arms</td>
<td>272 Arms</td>
<td>342 Arms</td>
<td>412 Arms</td>
<td></td>
</tr>
<tr>
<td>Off-grid symmetrical overload</td>
<td>110 % for 30 min - 125 % for 10 min - 150 % for 30 sec</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Off-grid asymmetrical overload</td>
<td>190 % for 30 min - 215 % for 10 min - 260 % for 30 sec</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Off-grid symmetrical short-circuit</td>
<td>90 Arms for 40 ms + 75 Arms for 60 ms</td>
<td>180 Arms for 40 ms + 150 Arms for 60 ms</td>
<td>270 Arms for 40 ms + 225 Arms for 60 ms</td>
<td>300 Arms for 40 ms + 250 Arms for 60 ms</td>
<td>375 Arms for 40 ms + 312 Arms for 60 ms</td>
<td>450 Arms for 40 ms + 375 Arms for 60 ms</td>
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</tr>
<tr>
<td>Off-grid asymmetrical short-circuit</td>
<td>145 Arms for 40 ms + 115 Arms for 60 ms</td>
<td>290 Arms for 40 ms + 230 Arms for 60 ms</td>
<td>425 Arms for 40 ms + 345 Arms for 60 ms</td>
<td>483 Arms for 40 ms + 383 Arms for 60 ms</td>
<td>604 Arms for 40 ms + 479 Arms for 60 ms</td>
<td>725 Arms for 40 ms + 575 Arms for 60 ms</td>
<td></td>
</tr>
<tr>
<td>THDI (%)</td>
<td>&lt; 3 %</td>
<td>&lt; 4 %</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topology</td>
<td>Single conversion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Efficiency</strong></td>
<td>Maximum efficiency</td>
<td>96.3 %</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Environment</strong></td>
<td>Environmental category</td>
<td>Non-air-conditioned indoor space</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Degree of protection</td>
<td>NEMA 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating ambient temperature</td>
<td>23 °F to 122 °F</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated temperature</td>
<td>32 °F to 104 °F</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage temperature</td>
<td>23 °F to 140 °F</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relative humidity</td>
<td>5 % to 95 % without condensation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling system</td>
<td>Smart cooling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acoustic level at 1 m</td>
<td>&lt; 60 dB</td>
<td>&lt; 64 dB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&lt; 67 dB</td>
</tr>
<tr>
<td>Altitude</td>
<td>0 to 1000 m (full power)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Mechanical specifications

<table>
<thead>
<tr>
<th>SUNSYS PCS® IM</th>
<th>Dimensions W x D x H (in.)</th>
<th>23.62 x 31.29 x 55.12</th>
<th>47.24 x 31.29 x 55.12</th>
<th>31.69 x 31.73 x 84.65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (lbs.)</td>
<td>783</td>
<td>1168</td>
<td>1799</td>
<td>974</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>MCM - MICROGRID CONTROL MODULE(1)</th>
<th>Dimensions W x D x H (in.)</th>
<th>31.49 x 15.75 x 78.74</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (lbs.)</td>
<td>441</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DISTRIBUTION CABINET(1)</th>
<th>Dimensions W x D x H (in.)</th>
<th>31.49 x 15.75 x 78.74</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (lbs.)</td>
<td>661</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>BATTERY CABINET(1)</th>
<th>Dimensions W x D x H (in.)</th>
<th>20.47 x 36.61 x 70.87</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (lbs.)</td>
<td>The weight depends on the configuration. For more detailed information, please contact us.</td>
<td></td>
</tr>
</tbody>
</table>

(1) All dimensions and weights are indicative only. For more detailed information, please contact us.
Socomec: our innovations supporting your energy performance

1 independent manufacturer
3,200 employees worldwide
10% of sales revenue dedicated to R&D
400 experts dedicated to service provision

Your power management expert

The specialist for critical applications

- Control, command of LV facilities
- Safety of persons and assets
- Measurement of electrical parameters
- Energy management
- Energy quality
- Energy availability
- Energy storage
- Prevention and repairs
- Measurement and analysis
- Optimization
- Consultancy, commissioning and training

A worldwide presence

12 production sites
- France (x3)
- Italy (x2)
- Tunisia
- India
- China (x2)
- USA (x3)

27 subsidiaries
- Australia
- Belgium
- China
- France
- Germany
- India
- Italy
- Netherlands
- Poland
- Romania
- Singapore
- Slovenia
- Spain
- Switzerland
- Thailand
- Tunisia
- Turkey
- UK
- USA

80 countries where our brand is distributed

POWER SWITCHING
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